Claim Amendments:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method for depositing a biaxially textured film on a substrate, comprising:
   depositing a film on a substrate with a deposition flux at an oblique incident angle, while simultaneously bombarding said deposited film using an ion beam at an ion beam incident angle arranged along either a best ion texture direction (BITD) or a second best ion texture direction of said film, thereby forming a biaxially-textured film,
   wherein a deposition flux incident plane is arranged parallel to a direction along which said biaxially-textured film has the fastest in-plane growth rate.

2. (Original) The method of claim 1, wherein an angle between said deposition flux incident plane and an ion beam incident plane is about 45° or about 135°.

3. (Original) The method of claim 2, wherein said ion beam incident angle is in the range between about 10° and about 60° from film normal.

4. (Original) The method of claim 2, wherein said deposition flux incident angle is in the range between about 5° and about 80° from film normal.

5. (Original) The method of claim 2, wherein the deposition rate is above about 1 nm/second.

6. (Original) The method of claim 5, wherein said deposition rate is above about 3 nm/second.

7. (Original) The method of claim 2, wherein normal ion energy of said ion beam is in the range between about 150eV and about 1500eV.

8. (Original) The method of claim 2, wherein said biaxially-textured film comprises a cubic-structured material having said fastest growth rate direction along at least one of the crystal axes <100>, <010>, or <001>.

9. (Original) The method of claim 8, wherein the said biaxially-textured film comprises a material with a best ion texture direction (BITD) or a second best ion texture direction along <111> crystal direction.

10. (Original) The method of claim 9, wherein said material comprises at least one of: a fluorite type material, a pyrochlore type material, and a rare-earth C type material.

11. (Original) The method of claim 10, wherein said fluorite type material comprises at least one of cerium oxide (CeO_2), RE doped cerium oxide $(RECe)O_2$, where RE is samarium, europium, erbium, lanthanum), yttria-stabilized zirconia (YSZ); wherein said pyrochlore type material comprises at least one of $Eu_2Zr_2O_7$ or $Gd_2Zr_2O_7$; and wherein said rare-earth C type material comprises yttrium oxide (Y_2O_3).

12. (Original) The method of claim 9, wherein said ion beam incident angle is about 55° from film normal.

13. (Original) The method of claim 9, wherein said deposition flux incident angle is in the range between about 20° and about 55° from film normal.

14. (Original) The method of claim 9, wherein said biaxially-textured film thickness is above about 0.2 μm.

15. (Original) The method of claim 2, wherein said biaxially-textured film comprises a cubic-structured material having said fastest growth rate direction along crystal axis <111>.

16. (Original) The method of claim 15, wherein the said biaxially-textured film comprises of a material with a best ion texture direction (BITD) or a second best ion texture direction along <110> crystal direction.

17. (Original) The method of claim 16, wherein said material comprises at least one of: a rock salt type material, a ReO_3 type material, and a perovskite type material.

18. (Original) The method of claim 17, wherein said material of said biaxially-textured film comprises at least one of magnesium oxide (MgO), nickel oxide (NiO), tungsten trioxide (WO_3), barium oxide (BaO), lanthanum aluminate ($LaAlO_3$), and strontium titanate ($SrTiO_3$)

19. (Original) The method of claim 16, wherein said ion beam incident angle is about 45° from film normal.

20. (Original) The method of claim 16, wherein said deposition flux incident angle is in the range between about 45° and about 65° from film normal.

21. (Original) The method of claim 1, wherein an angle between said deposition flux incident plane and an ion beam incident plane is about 0° or about 180° or about 90°.

22. (Original) The method of claim 21, wherein an ion to atom arrival ratio is less than about 0.5.

23. (Original) The method of claim 22, wherein said ion to atom arrival ratio is in the range between about 0.05 and about 0.3.

24. (Original) The method of claim 21, wherein said biaxially-textured film comprises a cubic-structured material having said fastest growth rate direction along at least one of the crystal axes <100>, <010>, or <001>.

25. (Original) The method of claim 24, wherein the said biaxially-textured film comprises a material with a best ion texture direction (BITD) or a second best ion texture direction along <110> crystal direction.

26. (Original) The method of claim 25, wherein said material comprises at least one of: a fluorite type material, a pyrochlore type material, and a rare-earth C type material.

27. (Original) The method of claim 26, wherein said fluorite type material comprises at least one of cerium oxide (CeO_2), RE doped cerium oxide ($(RECe)O_2$, where RE is samarium, europium, erbium, lanthanum), yttria-stabilized zirconia (YSZ); wherein said pyrochlore type material comprises at least one of $Eu_2Zr_2O_7$ or $Gd_2Zr_2O_7$; and wherein said rare-earth C type material comprises yttrium oxide (Y_2O_3).

28. (Original) The method of claim 25, wherein said ion beam incident angle is about 45° from film normal.

29. (Original) The method of claim 25, wherein said deposition flux incident angle is in the range between about 20° and about 55° from film normal.

30. (Original) The method of claim 21, wherein said ion beam incident angle is in the range between about 10° and about 60° from film normal.

31. (Original) The method of claim 21, wherein said deposition flux incident angle is in the range between about 5° and about 80° from film normal.

32. (Original) The method of claim 21, wherein the deposition rate is above about 1 nm/second.

33. (Original) The method of claim 32, wherein said deposition rate is above about 3 nm/second.

34. (Original) The method of claim 21, wherein normal ion energy of said ion beam is in the range between about 150eV and about 1500eV.

35. (Original) The method of claim 34, wherein normal ion energy of said ion beam is in the range between about 500eV and about 900eV.

36. (Original) The method of claim 25, wherein said biaxially-textured film thickness is above about 0.2 μm.

37. (Original) The method of claim 1, wherein an intermediate layer is deposited between said substrate and said biaxially-textured film.

38. (Original) The method of claim 37, wherein the grain size of said intermediate layer is in nanometer scale.

39. (Currently Amended) The method of claim 37, wherein the lattice mismatch between said intermediate layer and said biaxially-textured film is larger than about 10%~~, preferably larger than about 20%~~.

40. (Currently Amended) The method of claim 37, wherein said intermediate layer comprises at least one of rare earth C types material, ~~such as yttrium oxide (Y_2O_3), Eu_2O_3 and Pr_2O_3;~~ oxides ~~such as yttria stabilized zirconium oxide (YSZ)~~, and nitrides ~~such as silicon nitride (Si_3N_4)~~.

41. (Original) A method for depositing a biaxially textured film on a substrate, comprising: depositing a film on a substrate with a deposition flux at an oblique incident angle, while simultaneously bombarding said deposited film using an ion beam, thereby forming a biaxially-textured film, wherein said ion beam is substantially parallel to substrate normal.

42. (Original) The method of claim 41, wherein said deposition flux incident angle is in the range between about 5° to about 80° from film normal.

43. (Original) The method of claim 42, wherein said deposition flux incident angle is in the range between about 45° to about 65° from film normal.

44. (Original) The method of claim 41, wherein a material comprises at least one of: a rock salt type material, a ReO_3 type material, and a perovskite type material.

45. (Original) The method of claim 44, wherein said material comprises at least one of magnesium oxide (MgO), nickel oxide (NiO), tungsten trioxide (WO_3), barium oxide (BaO), lanthanum aluminate ($LaAlO_3$), and strontium titanate ($SrTiO_3$).

46. (Original) The method of claim 41 wherein said biaxially-textured film has <001> crystal direction substantially parallel to the substrate normal.

47. (Original) The method of claim 41, wherein the deposition rate is above about 1 nm/second.

48. (Original) The method of claim 47, wherein said deposition rate is above about 3 nm/second.

49. (Original) The method of claim 41, wherein normal ion energy of said ion beam is in the range between about 300eV and about 1500eV.

50. (Original) The method of claim 41, wherein an intermediate layer is deposited between said substrate and said biaxially-textured film.

51. (Original) The method of claim 50, wherein the grain size of said intermediate layer is in nanometer scale.

52. (Currently Amended) The method of claim 50, wherein the lattice mismatch between said intermediate layer and said biaxially-textured film is larger than about 10%~~, preferably larger than about 20%~~.

53. (Currently Amended) The method of claim 50, wherein said intermediate layer comprises at least one rare earth C types material, ~~such as yttrium oxide (Y_2O_3), Eu_2O_3 and Pr_2O_3;~~ oxides ~~such as yttria stabilized zirconium oxide (YSZ)~~, and nitrides ~~such as silicon nitride (Si_3N_4)~~.

54. (Original) A method for depositing a biaxially textured film on a substrate, comprising: depositing a film on a substrate with a deposition flux at an oblique incident angle, while simultaneously bombarding said deposited film using an ion beam, thereby forming a biaxially-textured film, wherein an ion beam incident angle is at a glancing angle along substrate surface.

55. (Original) The method of claim 54, wherein an angle between said deposition flux incident plane and an ion beam incident plane is about 45° or about 135°.

56. (Original) The method of claim 54, wherein a material comprises at least one of a rock salt type material, a ReO_3 type material, and a perovskite type material.

57. (Original) The method of claim 56, wherein said material comprises at least one of magnesium oxide (MgO), nickel oxide (NiO), tungsten trioxide (WO_3), barium oxide (BaO), lanthanum aluminate ($LaAlO_3$), and strontium titanate ($SrTiO_3$).

58. (Original) The method of claim 54, wherein said deposition flux incident angle is in the range between about 5° to about 80° from film normal.

59. (Original) The method of claim 58, wherein said deposition flux incident angle is in the range between about 45° to about 65° from film normal.

60. (Original) The method of claim 54, wherein normal ion energy of said ion beam is in the range between about 300eV and about 1500eV.

61. (Original) The method of claim 60, wherein normal ion energy of said ion beam is in the range between about 700eV and about 900eV.

62. (Original) The method of claim 54, wherein an intermediate layer is deposited between said substrate and said biaxially-textured film.

63. (Original) The method of claim 62, wherein the grain size of said intermediate layer is in nanometer scale.

64. (Currently Amended) The method of claim 62, wherein the lattice mismatch between said intermediate layer and said biaxially-textured film is larger than about 10%~~, preferably larger than about 20%~~.

65. (Currently Amended) The method of claim 62, wherein said intermediate layer comprises at least one rare earth C types material, ~~such as yttrium oxide (Y_2O_3), Eu_2O_3 and Pr_2O_3;~~ oxides ~~such as yttria stabilized zirconium oxide (YSZ)~~, and nitrides ~~such as silicon nitride (Si_3N_4)~~.

66. (Currently Amended) A method for depositing a biaxially textured film on a substrate, comprising: depositing a film on a substrate with a deposition flux at an oblique incident angle, while an assisting ion beam bombards said deposited film simultaneously during deposition, thereby forming a biaxially-textured film~~, or depositing a film on a substrate with a deposition flux along substrate normal, while simultaneously bombarding said deposited film using an oblique ion beam, thereby forming a biaxially textured film~~,
wherein said biaxially-textured film comprises a non-cubic layer-structured material with strong anisotropic growth rate along an a-b plane, wherein said growth rate along said a-b plane is much higher than along a c-axis.

67. (Original) The method of claim 66, wherein said biaxially-textured film is grown under dynamical growth conditions so that said film has said a-b plane substantially parallel to substrate normal and said c-axis of said film lies on said substrate, wherein said ion beam incident plane is substantially parallel to said a-b plane.

68. (Original) The method of claim 67, wherein said ion beam incident angle from substrate normal is in the range between about 10° and about 60°.

69. (Original) The method of claim 68, wherein said ion beam incident angle is about 45° from substrate normal.

70. (Original) The method of claim 67, wherein said ion beam incident angle is a glancing angle along said substrate surface.

71. (Original) The method of claim 67, wherein said ion beam incident angle is substantially along substrate normal.

72. (Original) The method of claim 67, wherein said deposition flux incident angle is in the range between about 5° and about 80° from film normal.

73. (Original) The method of claim 67, wherein said angle between the ion beam incident plane and said deposition flux incident plane is about 0° or about 180° or about 90° or about 270°.

74. (Original) The method of claim 67, wherein said non-cubic layer-structured material comprises at least one deformed perovskite structured material or a rutile type material.

75. (Original) The method of claim 74, wherein said deformed perovskite structured material comprises $REBa_2Cu_3O_{7-\delta}$ where RE comprises at least one of yttrium, gadolinium, terbium, dysprosium, lanthanum, neodymium, samarium, europium, holmium, erbium, thulium, and ytterbium; and said rutile type material comprises at least one of TiO_2, SnO_2, WO_2, RuO_2, MnO_2, NbO_2, VO_2, IrO_2.

76. (Original) The method of claim 67, wherein the deposition rate is greater than about 1 nm/second.

77. (Original) The method of claim 76, wherein said deposition rate is above about 3 nm/second.

78. (Original) The method of claim 67, wherein a deposition temperature is sufficient to obtain the desired composition and stoichiometry of said non-cubic, layer-structured material.

79. (Original) The method of claim 78, wherein active oxygen is disposed substantially on said biaxially textured film during deposition to reduce said deposition temperature.

80. (Original) The method of claim 79, wherein said active oxygen comprises at least one of atomic oxygen, ozone, oxygen ions, or N_2O.

81. (Original) The method of claim 67, wherein an intermediate layer is deposited between said substrate and said biaxially textured film.

82. (Original) The method of claim 81, wherein the grain size of said intermediate layer is in nanometer scale.

83. (Currently Amended) The method of claim 81, wherein the lattice mis-match between said intermediate buffer and said biaxially-textured film is larger than about 10%~~, preferably larger than about 20%~~.

84. (Currently Amended) The method of claim 81, wherein said intermediate layer comprises at least one rare earth C types material, ~~such as yttrium oxide (Y_2O_3), Eu_2O_3 and Pr_2O_3;~~ oxides ~~such as yttria stabilized zirconium oxide (YSZ)~~, and nitrides ~~such as silicon nitride (Si_3N_4)~~.

85. (Original) The method of claim 1, wherein said deposition flux is provided using at least one of evaporation method including resistive heating evaporation, co-evaporation, electron beam evaporation, magnetron sputtering, pulsed laser ablation, ion beam sputtering.

86. (Original) The method of claim 41, wherein said deposition flux is provided using at least one of evaporation method including resistive heating evaporation, co-evaporation, electron beam evaporation, magnetron sputtering, pulsed laser ablation, ion beam sputtering.

87. (Original) The method of claim 54, wherein said deposition flux is provided using at least one of evaporation method including resistive heating evaporation, co-evaporation, electron beam evaporation, magnetron sputtering, pulsed laser ablation, ion beam sputtering

88. (Original) The method of claim 66, wherein said deposition flux is provided using at least one of evaporation method including resistive heating evaporation, co-evaporation, electron beam evaporation, magnetron sputtering, pulsed laser ablation, ion beam sputtering

89. (Withdrawn) A high-temperature superconductor article, comprising:

a substrate;

a biaxially-textured film deposited on said substrate by method of claim 1 or claim 41 or claim 54, or claim 66; and

a superconducting layer disposed on biaxially-textured film

wherein said biaxially-textured film comprises a sharply textured layer, said sharply texture layer having ($\Delta\phi$) less than about 15° and ($\Delta\omega$)less than about 10°.

90. (Withdrawn) The superconductor article of claim 89, wherein said substrate is a flexible metal tape having a thickness less than about 0.15 mm.

91. (Withdrawn) The superconductor article of claim 90, wherein said metal tape is electropolished or chemical-mechanically polished to an average roughness of less than about 10nm.

92. (Withdrawn) The superconductor article of claim 89, wherein said superconducting layer comprises at least one oxide superconductor material.

93. (Withdrawn) The superconductor article of claim 92, wherein said oxide superconducting material comprises rare-earth barium copper oxides $REBa_2Cu_3O_{7-\delta}$, where RE is at least one of yttrium, gadolinium, terbium, dysprosium, lanthanum, neodymium, samarium, europium, holmium, erbium, thulium and ytterbium.

94. (Withdrawn) The superconductor article of claim 89, wherein said superconducting layer has a thickness in the range between about 1.0μm and about 20.0μm.

95. (Withdrawn) The superconductor article of claim 89, wherein said superconductor article is a power cable.

96. (Withdrawn) The superconductor article of claim 95, wherein said power cable comprises at least one inner central conduit for passage of a cooling fluid.

97. (Withdrawn) The superconductor article of claim 89, wherein said superconductor article is a power transformer.

98. (Withdrawn) A power generator having the superconductor article of claim 89.

99. (Withdrawn) The power generator of claim 98, wherein said power generator further comprises a shaft coupled to a rotor comprising at least one electromagnet having a rotor coil, a stator comprising a conductive winding surrounding said rotor, wherein said rotor coil comprises said superconductor article.

100. (Withdrawn) A power grid having the superconductor article of claim 89.

101. (Withdrawn) The power grid of claim 100, wherein said power grid further comprises a power generation station having a power generator, a transmission substation with at least one power transformer, at least one power transmission cable; a power substation, and at least one power distribution cable.

102. (Withdrawn) The superconducting article of claim 89, further including an epitaxial buffer layer between said biaxially-textured film and said superconducting layer.